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CLAIMS

1. Fluid bed (F1) granulation process of a predetermined substance at controlled temperature, comprising the steps of removing the finished hot granules from said granulation fluid bed (F1), cooling down said granules in a cooling fluid bed (F2), continuously formed and supported by a respective flow of fluidification air, characterized in that at least part of the fluidification air coming out from said cooling fluid bed (F2) of the finished granules is fed into the granulation fluid bed (F1).
2. Granulation process according to claim 1, characterized in that all of the fluidification air fed into the granulation bed (F1) comes from the cooling bed (F2).
3. Granulation process according to claim 1, characterized in that substantially all of the fluidification air coming out from the cooling bed (F2) is used as fluidification air for said granulation bed (F1).
4. Fluid bed (F1) granulation process of a predetermined substance at controlled temperature, comprising a step of cooling finished hot granules in a respective cooling fluid bed (F2), characterized in that it uses one single flow of fluidification air to continuously form and support, in order, said cooling and granulation fluid beds (F1, F2), substantially arranged in series with respect to said single flow.
5. Granulation process according to claim 4, characterized in that the finished granules of said substance are transferred substantially in a cascade to said cooling fluid bed (F1).

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6. Apparatus for carrying out the fluid bed granulation process at controlled temperature of claim 4, comprising a self-supporting structure (2) substantially shaped like a container, defining a granulation space (A) inside of it, in which a shelf (14) is positioned, intended to support a granulation fluid bed (F1), characterized in that it comprises, in said space (A), a further base plate (4), positioned below and in a predetermined distanced relationship from said shelf (14), said base plate (4) being intended to support a respective cooling fluid bed (F2) of hot finished granules coming from said granulation bed (F1), said cooling bed (F2) being in fluid communication with said granulation bed (F1) through said shelf (14), provided perforated, grated or in any case permeable to gas flows, a downcomer (16), extending vertically in said space (A), suitable for the transfer of finished granules from said granulation fluid bed (F1) to said cooling fluid bed (F2) at said further base plate (4), means for feeding and distributing (22, 19) fluidification air in said space (A) below said further base plate (4), to form and maintain said cooling bed (F2) and said granulation bed (F1), which are arranged in series with respect to said flow.

7. Apparatus according to claim 6, characterized in that said downcomer (16) comprises a vertical panel (15), supported in said space (A) in a predetermined spaced relationship from a wall (8) of said container structure (2), defining with it an interspace (16), said panel (15) having a horizontal bottom side spaced from said further base plate (4), so as to define with it a passage (15a), suitable for putting said interspace (16) in communication with the space (A) above the aforementioned base plate (4).

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8. Apparatus according to claim 7, characterized in that said interspace (16) is in communication at the top with said space (A), through an opening (11) provided in it:

5 9. Apparatus according to claim 6, characterized in that said cooling fluid bed (F2) is in communication with the outside through a pocket (18) comprised between a wall (7) of said container structure (2) and a front panel (17) fixed to the base plate (4) supporting the cooling bed (F2) and preferably parallel to said top wall (7).

10 10. Apparatus according to claim 9, characterized in that said front panel 17 comprises a mobile bulkhead (21), adjustable in height.